the beach flora. In the salt marshes is found the most halophytic flora. Several plants have hygrophilous characters, as canals or lacunae.

In conclusion, the coastal flora is composed of xerophilous and halophilous members, showing points of contact; plants of the xerophilous flora have moderately xerophilous characters, such as epidermal protections slightly developed; plants of the halophilous flora exhibit succulency of leaves and of stem and water-tissues; characters in common to the two are isolaterality of leaves and compact structure of the mesophyll.

The author objects to SCHIMPER's placing halophytes among xerophytes and says: "The assimilation results from confusion between the two different parts of the coastal flora; truly halophilous plants do not often show xerophilous characters; such characters at least in the marshes would be very difficult to explain in spite of the arguments of SCHIMPER; besides, several species of the salt marshes on the contrary have certain hygrophilous peculiarities. The fact that there are succulent plants outside the coast simply proves that succulency may be related to other factors of the soil besides salt, but its frequency in plants of salty earths shows that there exists a certain relation between succulency and salt. The nature of the relation is impossible of determination." Either argument, that succulency permits plants to resist the toxic action of salt, or that the appearance of succulent plants on the coast is due to lack of competition there, he thinks insufficient, and concludes that a flora as special as that of the salt marsh should be considered as halophilous in the proper sense of the word. The author admits that succulency may be due to other factors than salt in the soil, but does not make it clear why he objects to considering that "physiologically dry" soil and really dry soil may occasion the same structure. SCHIMPER'S argument seems to us to stand. —A. M. STARR.

Inheritance of flower-form and color in Digitalis.—A familiar garden variety of *Digitalis* has the central axis terminated by a peloric flower. KEEBLE, PELLEW, and JONES[15] find that this form is a Mendelian recessive to the typical form, and that, as might be expected, the inheritance is the same whether the seeds are taken from the peloric flower or the normal zygomorphic flowers of the same plant. The flower-color is referred to three pairs of allelomorphs: *Mm*, a magenta factor; *Dd*, a darkener which changes the magenta to purple; and *Ww*, a dominant white factor which removes the effect of *M* except in the small spots which occur on the corollas of all *Digitalis*. When *M* is present these spots are red, and when absent they are yellow.

MISS SAUNDERS[16] has studied the inheritance of an interesting form of

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[15] KEEBLE, F., PELLEW, MISS C., and JONES, W. N., The inheritance of peloria and flower-color in foxglove (*Digitalis purpurea*). New Phytologist **9**:68–77. *fig. 1.* 1910.

[16] SAUNDERS, MISS E. R., On inheritance of a mutation in the common foxglove (*Digitalis purpurea*). New Phytologist **10**:47–63. *pl. 1. figs. 12.* 1911.

Digitalis which has been noted occasionally for nearly a century, and which was described by CHAMISSO in 1826 under the name *D. purpurea heptandra.* The characteristic features of this form consist of a dialysis of the corolla and staminody of three or more of the petals, thus producing flowers having most typically 7–9 stamens, and scarcely to be recognized as a *Digitalis* flower at all. The degree of development of these characters is variable, and somewhat influenced by the environment, but there is no real transition to the normal form. This form proves to be like the peloric variety, a Mendelian recessive to the normal. The reviewer has also been studying the inheritance of this peculiar variety for five years, and has reached the same conclusion. Miss SAUNDERS confirms the results of KEEBLE, PELLEW, and JONES as to the color-characters.—GEO. H. SHULL.

Water relations of desert plants.—FITTING[17] has studied the water relations of the plants growing on the Sahara. He finds, as LIVINGSTON found for the Arizona desert, that the water is generally gained from the surface layers of the soil and not by deep rooting. Many of the plants, especially the perennial shrubs not provided with water-storage organs, develop remarkably high osmotic pressure, which enables them to withdraw water from the comparatively dry soil. On the other hand, the annuals showed much lower osmotic pressure, with lack of ability to thrive in the most exposed places. In many cases the high pressures were due largely to stored NaCl, but frequently entirely to other solutes. Of the 46 species studied, 21 per cent showed an osmotic pressure exceeding 100 atmospheres; 35 per cent exceeded 53 atmospheres; 52 per cent, 37 atmospheres; while only 11 per cent showed osmotic pressures as low as 11 to 22 atmospheres. Species showing extremely high pressures in dry desert conditions show much lower pressures in moist situations. This marked power of certain plants to adjust their osmotic pressures to the water-withholding power of the medium in which they grow has been demonstrated for salt marsh plants by HILL,[18] a piece of work which FITTING does not cite. We have known little about the osmotic pressure of desert forms, and this work supplies much of the deficiency and makes this character of great significance in the physiology of these forms.—WILLIAM CROCKER.

Permeability.—SCHROEDER[19] has studied the semipermeable membrane of the wheat grain, and confirms the work of BROWN on the barley, but adds little that is new. The portion of the coat forming the semipermeable mem-

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[17] FITTING, HANS, Die Wasserversorgung und die osmotischen Druckverhältnisse der Wüstenpflanzen. Zeitsch. Bot. **3**:209–275. 1911.

[18] HILL, F. G., New Phytologist **7**:133–142. 1908; Rev. in BOT. GAZETTE **47**:170. 1909.

[19] SCHROEDER, H., Ueber die selektiv permeable Hülle des Weizenkornes. Flora **102**:186–208. 1911.